Your Global Automation Partner

TURCK

TBIL-M1-16DXP-B
I/O Hub with IO-Link

Instructions for Use

Table of Contents

1 About These Instructions

These operating instructions describe the structure, functions and the use of the product and will help you to operate the product as intended. Read these instructions carefully before using the product. This is to avoid possible damage to persons, property or the device. Retain the instructions for future use during the service life of the product. If the product is passed on, pass on these instructions as well.

1.1 Target groups

This document is written for specially trained personnel, and must be read carefully by anyone who is responsible for the mounting, commissioning, operation, maintenance, disassembly or disposal of the device.

1.2 Explanation of Symbols Used

The following symbols are used in these instructions:

⚠	**DANGER** DANGER indicates a dangerous situation with high risk of death or severe injury if not avoided.
⚠	**WARNING** WARNING indicates a dangerous situation with medium risk of death or severe injury if not avoided.
⚠	**CAUTION** CAUTION indicates a dangerous situation of medium risk which may result in minor or moderate injury if not avoided.
❗	**NOTICE** NOTICE indicates a situation which may lead to property damage if not avoided.
ℹ	**NOTE** NOTE indicates tips, recommendations and useful information on specific actions and facts. The notes simplify your work and help you to avoid additional work.
▶	**CALL TO ACTION** This symbol denotes actions that the user must carry out.
⇨	**RESULTS OF ACTION** This symbol denotes relevant results of actions.

1.3 Additional Documents

The following additional documents are available online at **www.turck.com**:
- Data sheet
- Declaration of Conformity
- IO-Link devices commissioning manual

1.4 Feedback About These Instructions

We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to **techdoc@turck.com**.

2 Notes on the Product

2.1 Product Identification

These instructions are valid for the following devices:
- TBIL-M1-16DXP-B

2.2 Scope of Delivery

The scope of delivery includes:
- I/O hub
- Dummy plugs for M12-connectors
- Label clips
- Quick Start Guide

2.3 Legal Requirements

The device is subject to the following EC directives:
- 2014/30/EU (electromagnetic compatibility)
- 2011/65/EU (RoHS II Directive)

2.4 Manufacturer and Service

Hans Turck GmbH & Co. KG
Witzlebenstraße 7
45472 Muelheim an der Ruhr
Germany

Turck supports you with your projects, from initial analysis to the commissioning of your application. The Turck product database contains software tools for programming, configuration or commissioning, data sheets and CAD files in numerous export formats. You can access the product database at the following address: **www.turck.de/products**
For further inquiries in Germany contact the Sales and Service Team on:

- Sales: +49 208 4952-380
- Technology: +49 208 4952-390

Outside Germany, please contact your local Turck representative.

3 For Your Safety

The product is designed according to state-of-the-art technology. However, residual risks still exist. Observe the following warnings and safety notices to prevent damage to persons and property. Turck accepts no liability for damage caused by failure to observe these warning and safety notices.

3.1 Intended Use

These devices are designed solely for use in industrial areas.
The block module TBIL-M1-16DXP-B is an IO-Link device (Class B) and serves as I/O hub between field devices (sensors/actuators) and the IO-Link master. The hub has 16 I/O channels. Each I/O channel can be used as digital in- or output without additional configuration. The device is designed in IP67/IP69K and can be mounted directly in the field.
The devices can be used in safety functions up to Performance Level d (acc. to IEC 13849) and SIL 2 (acc. to ISO 61508). For the outputs at the connectors C4…C7, the supply voltage V2 can be safely switched off by an external safety relay or a safety PLC.
The devices may only be used as described in these instructions. Any other use is not in accordance with the intended use. Turck accepts no liability for any resulting damage.

3.2 General Safety Instructions

- The device may only be assembled, installed, operated, parameterized and maintained by professionally-trained personnel.
- The device may only be used in accordance with applicable national and international regulations, standards and laws.
- The device only meets the EMC requirements for industrial areas and is not suitable for use in residential areas.

3.3 Notes on the Use in Safety-Related Applications

- For the use in safety-related applications: Observe chapter "Using the device in safety applications".
- The device is part of a safety-related overall system. The overall system must always be evaluated as a whole with regard to the requirements of EN ISO 13849-1 and EN IEC 61508.
- The device is not specified for a certain application. Make sure that application-specific aspects are considered.
- Replace the device before the end of its service life (see "Safety characteristic data for the galvanic isolation").
- If there is a fault, e.g. a defective housing, do not use the device.
- During operation, surface temperatures may occur that could cause burns if touched.
- Perform a function test every 12 months
- The devices must not be repaired. If problems occur with regard to functional safety, notify Turck immediately and return the devices immediately to:

    Hans Turck GmbH & Co. KG
    Witzlebenstraße 7
    45472 Muelheim an der Ruhr
    Germany

4 Product Description

The I/O hub TBIL-M1-16DXP-B connects up to 16 digital sensors or actuators with one IO-Link master port.
For the connection of field devices, eight M12 connectors are available. Each I/O channel of the TBIL-M1-16DXP-B can be used as digital in- or output without additional configuration. The I/O hub is connected to the IO-Link master via an M12 female connector. The devices are designed in a fully encapsulated housing with degree of protection IP67/IP69K.

4.1 Device Overview
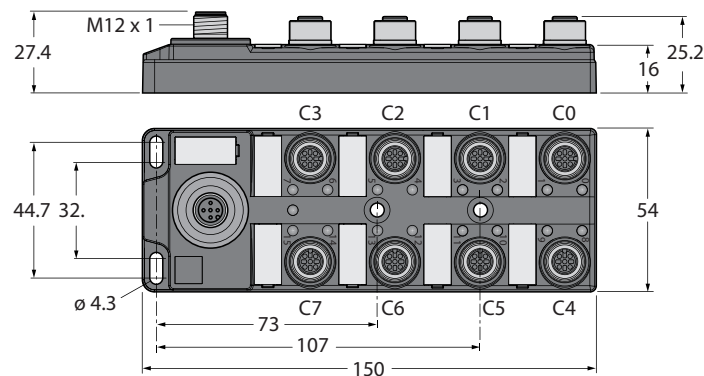
Fig. 1: Dimensions

4.1.1 Display Elements

The device has the following LED indicators:
- IO-Link communication
- I/O status

4.2 Properties and Features

- Fibre-glass reinforced housing
- Shock and vibration tested
- Fully potted module electronics
- Protection class IP67/IP69K
- IO-Link Class B device with 2 galvanically isolated supply voltages (V1/V2)
- IO-Link diagnostics for short-circuit and supply over- and undervoltage
- 2 universal digital channels per connector
- Metal connectors

4.3 Functions and Operating Modes

The I/O hub TBIL-M1-16DXP-B is an IO-Link Class B device with 2 galvanically isolated supply voltages V1 and V2. The connectors C0…C3 are supplied from V1, the connectors C4…C7 from V2. The two supply voltages are galvanically isolated. This allows that the V2 voltage supply for the outputs at connectors C4...C7 can be safely switched off or not safely for the purpose of energy management.
The device provides diagnostics for power supply and short circuit of the sensors and actuators on the IO-Link master.

5 Mounting

The device is mounted via four M4 screws on a flat and pre-drilled mounting surface.

▸ Fasten the module to the mounting surface with 4 M4 screws. The maximum tightening torque for the screws is 0.5 Nm

M4 (4x)
max. 0.5 Nm

34

107

32,2 - 44,7
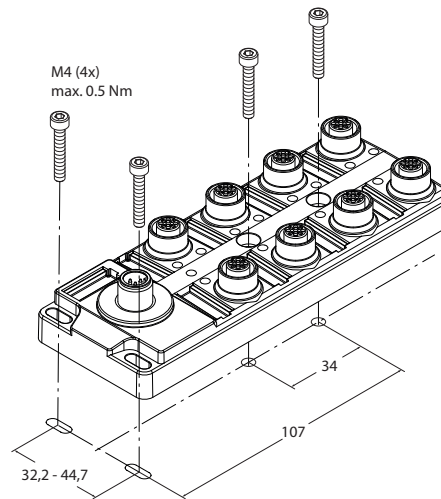
Fig. 2: Mounting the device to a mounting plate.

6 Connecting

> ⚠️ **WARNING**
> Penetration of liquids or foreign objects through leaking connections
> **Danger to life due to failure of the safety function**
> ▶ Tighten the M12 connectors with a tightening torque of 0.8 Nm.
> ▶ Always seal unused connectors with respective protection caps.

6.1 Connecting the Supply Voltage and IO-Link

> ⚠️ **WARNING**
> Defective power supply unit
> **Danger to life due to dangerous voltages on touchable parts**
> ▶ Only use SELV or PELV power supplies in accordance with EN ISO 13849-2, which allow a maximum of 60 VDC or 25 VAC in the event of a fault.

A 5-pole M12 connector is available for the connection to IO-Link and the supply voltage.
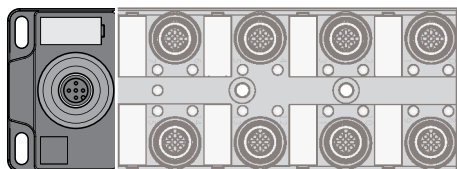
Fig. 3: M12 connector for the connection to IO-Link

▶ Connect the device to the supply voltage and IO-Link according to the pin assignment.


```
1 = 24 VDC (V1)
2 = 24 VDC (V2)
3 = GND (V1)
4 = C/Q (IO-Link)
5 = GND (V2)
```
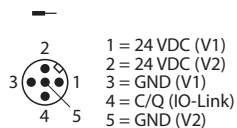
Fig. 4: Pin assignment IO-Link

6.1.1 Supply Concept

The I/O hub TBIL-M1-16DXP-B is supplied via the IO-Link connector with two galvanically isolated voltages V1 and V2 through the IO-Link connector. The IO-Link channels are separated into the different potential groups "detachable I/O" (supplied through V2) and "non-detachable" I/O (supplied through V1).
This allows a safety shutdown of parts of an installation via emergency stop circuits.
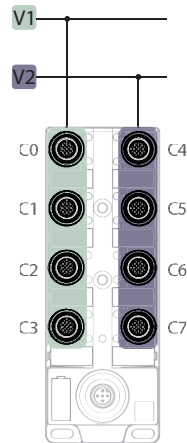
Fig. 5: Supply concept TBIL-M1-16DXP-B

V1 = supply of the module eclectronics and the connectors C0…C3
V2 = supply of the connectors C4…C7 with Class B supply

6.2 Connecting Digital Sensors and Actuators

For connecting digital sensors and actuators, 5-pin M12 connectors are available.
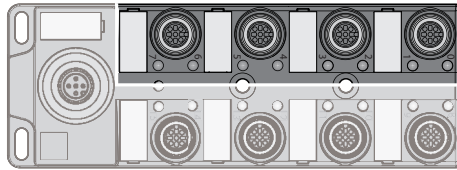
Fig. 6: M12 connector for connecting digital sensors and actuators (C0…C3)

▶ Connect the sensors and actuators to the device according to the pin assignment.

1 = V_{SENS} (V1)
2 = ⎍ In/Out
3 = GND (V1)
4 = ⎍ In/Out
5 = n.c.
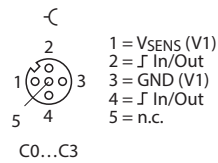
C0…C3

Fig. 7: Pin assignment TBIL-M1-16DXP-B (C0…C3)
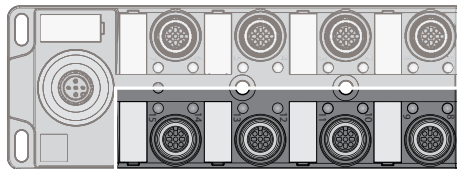
Fig. 8: M12 connector for connecting digital sensors and actuators (C4…C7)

▶ Connect the sensors and actuators to the device according to the pin assignment.

1 = V_{SENS} (V2)
2 = ⎍ In/Out
3 = GND (V2)
4 = ⎍ In/Out
5 = n.c.
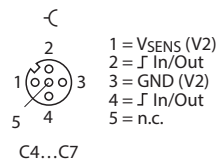
C4…C7

Fig. 9: Pin assignment TBIL-M1-16DXP-B (C4…C7)

External Supply of Sensors and Actuators

The TBIL-I/O hub can also be used to connect externally powered sensors and actuators. For the external supply of sensors and actuators, observe the following safety measures:

▶ Supply sensors and actuators from SELV or PELV power supplies.
▶ Decouple external circuits that are not designed as SELV/PELV systems by optocouplers, relays or other measures.

7 Using the Device in Safety Applications

The device is designed in accordance with EN ISO 13849-1 "Safety of machinery - Safety-related parts of control systems".

7.1 Safety Function

The safety function is executed by the higher-level system.
The supply voltage (V2) of the outputs at C4…C7 can be safely switched off by an external safety relay or a safety PLC.

Safe Status

In the safe state, the outputs at C4…C7 are switched off (0). The disconnection is done externally in the higher-level system.

Performance Level (PL)/SIL Level

In safety functions based only on fault exclusions, a maximum of PL d EN ISO 13849) and SIL 2 (EN IEC 61508) can be reached. The device is part of a safety-related overall system. The overall system must always be evaluated as a whole with regard to the requirements of EN ISO 13849-1 and EN IEC 61508.

7.1.1 Safety Characteristic Data for the Galvanic Isolation

Characteristic data	Value	Standard
PFH_D Average frequency of dangerous failure per hour	5×10^{-9} 1/h	IEC/EN 61508; EN/IEC 62061; EN/ISO 13849-1
$MTTF_D$ Mean Time To Failure Dangerous	> 100 a	EN/ISO 13849-1: 2016
PL (Performance Level)	d	EN/ISO 13849-1: 2016
SIL (Safety Integrity Level)	2	IEC/EN 61508
Diagnostic Coverage	0…99 %	EN/ISO 13849-1: 2016

7.1.2 Cited Standards

Standard	Title
DIN EN ISO 13849-1:2016	Safety of machinery – Safety-related parts of control systems
DIN EN 62061:2005 + A1:2013 IEC 62061:2005	Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems
DIN EN 61508:2011 IEC 61508:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems
DIN EN 61131-2:2008 IEC 61131-2:2007	Programmable controllers
EN ISO/ISO 12100	Safety of machinery – General principles for design – Risk assessment and risk reduction

7.2 Safety Planning

The operator is responsible for the safety planning.

Prerequisites

▶ Perform a hazard and risk analysis.
▶ Develop a safety concept for the machine or plant.
▶ Calculate the safety integrity for the complete machine or plant.
▶ Validate the complete system.

7.3 Safe Commissioning

7.3.1 Installing Connecting Cables Safely

> **!** **NOTICE**
> Incorrect connection of connecting cables
> **Danger of cross connections**
> ▶ Install and connect the cables safely and separately in accordance with EN 60204-1.
> ▶ Install cables with cross-circuit protection if the safe installation of the cables is not possible.

7.3.2 Switch-off Supply Voltage Safely

> **⚠ WARNING**
> 1-pole switch-off the supply voltage
> **Safe separation not guaranteed**
> ▶ Always switch-off the supply voltage on both poles.

7.3.3 Connecting Sensors and Actuators

> **⚠ WARNING**
> External feed
> **Deactivation of the galvanic isolation**
> ▶ If the galvanic isolation is used, ensure on the application side that no external feed can occur.
> ▶ Do not supply DXP inputs externally that operate with potential that can be safely switched off.

7.4 Function Tests

▶ Function test should only be carried out by qualified personnel.
▶ Before commissioning the system, check and document the switch-off of the V2 voltage group by an upstream safety relay.
▶ Control the switching behavior of he output circuits.
▶ If the maximum duty cycle is reached: Execute switch-off of the V2 voltage group by the safety relay to check the function of the safety system.

8 Parameterizing and Configuring

8.1 Parameters

IO-Link object directory – ISDU device parameters: Direct Parameter Page

ISDU Index Hex. (Dec.)	Sub index	Object name	Access	Length [Byte]	Meaning/default value
0x00 (0)		Direct Parameter Page 1	read only	16	
	0x07	Vendor ID	read only	2	0x013D (ID for Turck)
	0x08				
	0x09	Device ID	read only	3	TBIL-M1-16DXP-B: 0x1EB303
	0x0A				
	0x0B				

IO-Link object directory – ISDU device parameters: Identification

ISDU Index Hex. (Dec.)	Object name	Access	Length [Byte]	Meaning/ default value	Comment
0x10 (16)	Vendor Name	read only	16	Turck	
0x11 (17)	Vendor Text	read only	32	www.turck.com	
0x12 (18)	Product Name	read only	32	TBIL-M1-16DXP-B	
0x13 (19)	Product ID	read only	16	Ident no. of the device: 100000881	
0x14 (20)	Product Text	read only	32	I/O hub	
0x15 (21)	Serial Number	read only	16	Sequential serial number	
0x16 (22)	Hardware ID	r/w	8	Hardware ID of the device, e.g. V1.0	
0x17 (23)	Firmware Revision	read only	16	Firmware version of the device, e.g. V1.0.7.0	
0x18 (24)	Application Specific Tag	read/ write	32	Default "***"	Customer-specific or application-specific data can be stored in this field.
0x19 (25)	Function Tag	read/ write	32	Default "***"	The application-spe-cific device function can be stored in this field.

ISDU Index Hex. (Dec.)	Object name	Access	Length [Byte]	Meaning/ default value	Comment
0x1A (26)	Location Tag	read/ write	32	Default "***"	The application-specific installation location of the device can be stored in this field.

IO-Link object directory – ISDU device parameters: Preferred Index (parameters and diagnostics of the digital in- and outputs)

ISDU Index Hex. (dec.)	Object name	Access	Length [Byte]	Meaning
0x40 (64)	Parameter ID	read/ write	4	Customer-specific ID, for free use
0x41 (65)	Inverting Input	read/ write	2	Invert digital input
0x42 (66)	Activate Output	read/ write	2	Activate output
0x43 (67)	Impulse Stretching Input	read/ write	16	Pulse stretching input
0x44 (68)	Short Circuit Recovery	read/ write	2	Manual output reset after overcurrent
0x45 (69)	Failsafe	read/ write	4	Output After Error
0x46 (70)	Under Voltage Diagnostics	read/ write	2	Enable undervoltage diagnosis V2/Undervoltage value for V1 and V2
Diagnostics				
0x50 (80)	Supply Error	read only	2	■ Undervoltage supply V1/V2 ■ Overcurrent Vsens Connector C0…C7
0x51 (81)	Output Short Circuit	read only	2	Overcurrent output 0…15

Invert Digital Input – 0x41 (65), Sub Index 0

This parameter inverts the state of the digital input in the process image.

Format	Length	
Byte	1 byte	1 bit per channel

Default values are **shown in bold.**

Value	Meaning	
0	**No**	
1	Yes	Input signal inverted

Byte 0								Byte 1							
Bit offset								Bit offset							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
C7P2	C7P4	C6P2	C6P4	C5P2	C5P4	C4P2	C4P4	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4

> **NOTE**
> This parameter can also be set for all connectors of the module via the IODD.

Activate Output – 0x42 (66), Sub Index 0

this parameeter activates or deactivates the output function of the digital channel.

Format	Length	
Byte	1 byte	1 bit per channel

Default values are **shown in bold.**

Value	Meaning	
0	No	Output function deactivated, channel can only be used as input
1	**Yes**	Output function activated, channel can be used as in- or output

Byte 0								Byte 1							
Bit offset								Bit offset							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
C7P2	C7P4	C6P2	C6P4	C5P2	C5P4	C4P2	C4P4	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4

> **NOTE**
> This parameter can also be set for all connectors of the module via the IODD.

Pulse Stretching Input – 0×43 (67)

This parameter defines the duration of the pulse stretching for digital input edges in multiples of 10 ms. This allows that even short signals with longer PLC cycle times can be detected.

Format	Length	
Array of Bytes	8 byte	1 byte per channel

Default values are **shown in bold.**

Value	Meaning	
0	**disabled**	Pulse stretching deactivated
1	1…255	Pulse stretching input [*10 ms]

Bit offset								Bit offset							
0	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
Sub index								Sub index							
16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
C7P2	C7P4	C6P2	C6P4	C5P2	C5P4	C4P2	C4P4	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4

> **NOTE**
> This parameter can also be set for all connectors of the module via the IODD.

Manual Output Reset after Overcurrent – 0x44 (68), Sub Index 0

This parameter defines if a manual reset is necessary after an overcurrent occurred at the digital channel.

Format	Length	
Byte	1 byte	1 bit per channel

Default values are **shown in bold.**

Value	Meaning	
0	**No**	Automatic recovery mode
1	Yes	Controlled recovery mode (output has to be reset manually)

Byte 0								Byte 1							
Bit offset								Bit offset							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
C7P2	C7P4	C6P2	C6P4	C5P2	C5P4	C4P2	C4P4	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4

> **NOTE**
> This parameter can also be set for all connectors of the module via the IODD.

Output After Error – 0x45 (69), Sub Index 0

This parameter defines the behavior of the output in case of an interruption of the IO-Link communication.

Format	Length	
Array of Bytes	2 byte	2 bit per channel

Default values are **shown in bold.**

Value	Meaning	
00	**0**	Set output to 0
01	1	Set output to 1
10	Current value	Hold current value
11	reserved	

Byte 3				Byte 2				Byte 1				Byte 0			
Bit offset				Bit offset				Bit offset				Bit offset			
6	4	2	0	6	4	2	0	6	4	2	0	6	4	2	0
C7P2	C7P4	C6P2	C6P4	C5P2	C5P4	C4P2	C4P4	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4

ℹ️ **NOTE**
This parameter can also be set for all connectors of the module via the IODD.

Enable Undervoltage Diagnosis V2/Undervoltage Value for V1 and V2 – 0×46 (70), Sub Index 0

This parameter defines whether undervoltage diagnostics are sent to in case of an V2 under-voltage. Additionally it defines the threshold values for undervoltage diagnostics for V1 and V2.

Format	Length	
Array of Bytes	2 byte	2 bit per module

The default values are written in **bold**.

Value	Meaning	
Activate V2 diagnostics		
0	No	
1	**Yes**	V2 diagnostics activated
Threshold value for undervoltage diagnostics V1 and V2		
0	**Standard (IEC 61131-2)**	lower threshold: 19.2 V upper threshold: 20.4 V
1	Extended	lower threshold: 17.5 V

Byte 0							
Bit offset							
7	6	5	4	3	2	1	0
-	-	-	-	-	-	Activate diagnostics	Threshold

Byte 1							
Bit offset							
7	6	5	4	3	2	1	0
-	-	-	-	-	-	-	-

9 Operating

⚠️ **CAUTION**
Operating the device outside the specification
Slight injuries and equipment damage possible.

▶ Operate the unit only within the operating temperature specified in the technical data.

▶ Use only thermally suitable connection cables.

9.1 Process Input Data

Byte no.	Bit offset							
	7	6	5	4	3	2	1	0
Inputs								
0	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4
1	C7P2	C7P4	C6P2	C6P4	C5P2	C5P4	C4P2	C4P4
Module diagnostics								
2	Group diagnostics	-	-	-	Under-voltage V2	Under-voltage V1	-	-
Connector diagnostics – overcurrent sensor supply								
3	Overcurrent C7	Overcurrent C6	Overcurrent C5	Overcurrent C4	Overcurrent C3	Overcurrent C2	Overcurrent C1	Overcurrent C0
Channel diagnostics – overcurrent output								
4	Overcurrent C3P2	Overcurrent C3P4	Overcurrent C2P2	Overcurrent C2P4	Overcurrent C1P2	Overcurrent C1P4	Overcurrent C0P2	Overcurrent C0P4
5	Overcurrent C7P2	Overcurrent C7P4	Overcurrent C6P2	Overcurrent C6P4	Overcurrent C6P2	Overcurrent C5P4	Overcurrent C4P2	Overcurrent C4P4

ℹ️ **NOTE**
The diagnoses can also be accessed via IO-Link indices.

Designation	Meaning		
Inputs			
CxPy	0	Input inactive	
	1	Input active	
Module diagnostics			
Group diagnostics	0	No diagnostic message	
	1	Module diagnostics active	▶ Evaluate the bit to monitor the diagnostics cyclically. ⇨ Bit = 0: no diagnostics active ⇨ Bit = 1: Module diagnostics ▶ Bit = 1: Evaluate further diagnostic bits to determine the origin of the diagnosctic message.
Undervoltage Vx	0	No diagnostic message	
	1	Undervoltage of supply voltage V1 and V2	
Connector diagnostics – overcurrent sensor supply			
Overcurrent Cx	0	No diagnostic message	
	1	Overload at the sensor/actuator supply at the connector. At modules with group diagnostics all connector-LEDs of the supply group flash simultaneously in case of an error.	
Channel diagnostics – overcurrent output			
Overcurrent CxPy	0	No diagnostic message	
	1	Overlaod at the output/short-circuit	

9.2 Process Output Data

Byte no.	Bit offset							
	7	6	5	4	3	2	1	0
Outputs								
0	C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4
1	C7P2	C7P4	C6P2	C6P4	C5P2	C5P4	C4P2	C4P4

Designation	Meaning	
CxPy	0	Output inactive
	1	Output active

9.3 LED Displays

The device has the following LED indicators:
- IO-Link communication
- I/O status

9.3.1 IO-Link

IO-Link LED	Meaning
Green flashing	IO-Link communication error-free, valid process data are sent
Red	IO-Link communication error or module error
Red flashing (1 Hz)	IO-Link communication error-free, invalid process data or diagnostic message
Off	no voltage supply

9.3.2 Channel-LEDs

LED 0…15	Meaning (input)	Meaning (output)
Green	Input active	Output active
Red flashing (0.5 Hz)	Overload of the sensor supply In devices with group diagnostics, all connector-LEDs of the supply group flash simultaneously in case of an error.	
Red	–	Output active, overload/overcurrent at output
Off	Input inactive	Output inactive

9.4 Evaluating Diagnostic Data

Group Diagnostics: Undervoltage V1/V2 and Overcurrent Sensor Supply – 0x50 (80), Sub Index 0

Indicates errors in the module and sensor supply:
- Group diagnostics: Diagnostics pending at the module
- Undervoltage V1 (per module)
- Undervoltage V2 (per module)
- Overcurrent sensor supply (per connector)

Format	Length
Array of Bytes	2 byte

0 = no diagnostics
1 = diagnostic message

Byte 0							
Bit offset							
15	14	13	12	11	10	9	8
Group diagnostics	-	-	-	Undervoltage supply V2	Undervoltage supply V1	-	-

Byte 1							
Bit offset							
7	6	5	4	3	2	1	0
Overcurrent Vsens C7	Overcurrent Vsens C6	Overcurrent Vsens C5	Overcurrent Vsens C4	Overcurrent Vsens C3	Overcurrent Vsens C2	Overcurrent Vsens C1	Overcurrent Vsens C0

Overcurrent Output – 0x51 (81), Sub Index 0

Indicates an overcurrent at the corresponding digital output.

Format	Length	
Array of Bytes	2 byte	1 bit per output

0 = no diagnostics
1 = diagnostic message

Byte 0							
Bit offset							
7	6	5	4	3	2	1	0
Overcurrent C3P2	Overcurrent C3P4	Overcurrent C2P2	Overcurrent C2P4	Overcurrent C1P2	Overcurrent C1P4	Overcurrent C0P2	Overcurrent C0P4

Byte 1							
Bit offset							
7	6	5	4	3	2	1	0
Overcurrent C7P2	Overcurrent C7P4	Overcurrent C6P2	Overcurrent C6P4	Overcurrent C6P2	Overcurrent C5P4	Overcurrent C4P2	Overcurrent C4P4

9.5 IO-Link Events

Event Code	Description	Event Mode	
0x5111	Undervoltage supply V1	0xF4 (appears)	Undervoltage at the supply group V1 (C0…C3)
		0xB4 (disappears)	
0x5112	Undervoltage supply V2	0xF4 (appears)	Undervoltage at the supply group V2 (C4…C7, Class B supply)
		0xB4 (disappears)	
0x7710	Overcurrent Vsens connector x or overcurrent output x	0xF4 (appears)	Group event for overcurrent: Overcurrent of the sensor supply at one of the connectors (C0…C7) or overcurrent at one of the outputs (DO0…DO15) The mapped diagnostics in the process image of the inputs show which slot or output detects an overcurrent.
		0xB4 (disappears)	

9.6 IO-Link Error Codes

Error code	Description	
0x8011	Index not available	
0x8012	Sub Index not available	
0x8023	Accesss denied	Index cannot be written
0x8030	Parameter value out of range	Parameter value out of range
0x8033	Parameter length overrun	Length of data to be written does not match the length defined for this parameter.
0x8034	Parameter length underrun	
0x8035	Function not available	Function not available in the device
0x8041	Inconsistent parameter set	Inconsistent parameters

10 Troubleshooting

If the device does not function as expected, first check whether ambient interference is present.
If there is no ambient interference present, check the connections of the device for faults.
If there are no faults, there is a device malfunction. In this case, decommission the device and replace it with a new device of the same type.

11 Maintenance

Ensure that the plug connections and cables are always in good condition.
The devices are maintenance-free, clean dry if required.

12 Repair

The device must not be repaired by the user. The device must be decommissioned if it is faulty.
Observe our return acceptance conditions when returning the device to Turck.

12.1 Returning Devices

Returns can only be accepted if a declaration of decontamination is enclosed with the device.
The declaration can be downloaded from
https://www.turck.de/en/retoure-service-6079.php
and must be completely filled in, and affixed securely and weather-proof to the outside of the packaging.

13 Disposal

The devices must be disposed of correctly and must not be included in normal household garbage.

14 Technical Data

Technical Data	
Power supply	
Operating/load voltage	24 VDC
Permissible range	18…30 VDC
Operating current	From V1: < 100 mA From V2: < 85 mA
Total current	Max. 4 A per voltage group, V1 + V2: max. 5.4 A
Sensor/actuator supply VAUX1	Supply connector C0…C3 from V1 short-circuit proof, 120 mA per connector, with diagnostics
Sensor/actuator supply VAUX2	Supply connector C4…C7 from V2 short-circuit proof, 120 mA per connector, with diagnostics
Potential isolation	Galvanic isolation from V1 and V2 voltage group, voltages up to 500 VDC
Inputs	
Number of channels	16 digital pnp inputs (EN 61131-2)
Type of input diagnostics	Type of input diagnostics
Signal voltage, low level	-3…5 VDC (EN 61131-2, type 1 and 3)
Signal voltage, high level	11…30 VDC (EN 61131-2, type 1 and 3)
Input delay	2.5 ms
Max. input current	15 mA
Outputs	
Number of channels	16 digital pnp outputs
Type of output diagnostics	Channel diagnostics
Output voltage	24 VDC from supply voltage
Output current per channel	1.8 A, short-circuit-proof
Output delay	1.3 ms
Load type	Ohmic, inductive lamp load
IO-Link	
IO-Link specification	Specified according to version 1.1
Parameterization	FDT/DTM, IODD
Transmission rate	COM 2: 38,4 kbit/s
Transmission physics	3-wire physics (PHY2)
Minimum cycle time	4.2 ms
Connectors	
IO-Link	M12 × 1, 5-pole
Input/output	M12 × 1, 5-pole
Permissible torques ■ IO-Link ■ I/O channels ■ Mounting (M4 screws)	 0.8 Nm 0.8 Nm 0.5 Nm

Technical Data	
Standard/Directive conformity	
Vibration test	According to EN 60068-2-6
Shock test	According to EN 60068-2-27
Drop and topple	According to IEC 60068-2-31/IEC 60068-2-32
Electro-magnetic compatibility	According to EN 61131-2/-6-4
Approvals	CE, cULus
General Information	
Dimensions (B × L × H)	54 × 150 × 27.4 mm
Operating temperature	-40...+55 °C (at total current up to 5.4 A) -40...+70 °C (at total current up to 4 A)
Storage temperature	-40…+85 °C
Protection class	IP67/IP69K
MTTF	79 years
Housing material	PA6-GF30
Housing color	Black
Halogen-free	Yes
Mounting	4 mounting holes, Ø 4,3 mm

15 Appendix: Declaration of Conformity

EU-Konformitätserklärung Nr.:   **5035-2M**
EU Declaration of Conformity No.:

Wir/ We: HANS TURCK GMBH & CO KG
WITZLEBENSTR. 7, 45472 MÜLHEIM A.D. RUHR

erklären in alleiniger Verantwortung, dass die Produkte
declare under our sole responsibility that the products

Kompakte I/O Module in IP20/IP67:   Typen / types: FDN20-*, FDNL-*, FDNP-*, FDP20-*, FGDP-*, FGEN-*,
Compact I/O modules in   FLDP-*, FLIB-*, FXEN-*, SDPX-*, TBDP-*, TBEN-*, TBIL-*, TBPN-*
IP20/IP67:

auf die sich die Erklärung bezieht, den Anforderungen der folgenden EU-Richtlinien durch Einhaltung der
folgenden Normen genügen:
to which this declaration relates are in conformity with the requirements of the following EU-directives by compliance with the following
standards:

EMV - Richtlinie /EMC Directive   2014 / 30 / EU   26.02.2014
EN 61131-2:2007 (Abschnitte / section 8, 9, 10)

RoHS – Richtlinie /RoHS Directive   2011 / 65 / EU   08.06.2011

Weitere Normen, Bemerkungen:
additional standards, remarks:

Zusätzliche Informationen:
Supplementary infomation:

Mülheim, den 13.07.2018

Ort und Datum der Ausstellung /   i.V. Dr. M. Linde, Leiter Zulassungen /Manager Approvals
Place and date of issue   Name, Funktion und Unterschrift des Befugten /
Name, function and signature of authorized person

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